

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-123207

(43)Date of publication of application : 15.05.1998

(51)Int.Cl.

G01R 31/26
H01L 21/66

(21)Application number : 08-273675

(71)Applicant : NEC CORP

(22)Date of filing : 16.10.1996

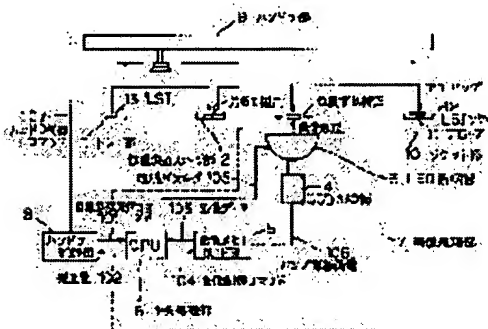
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(54) LSI HANDLER

(57)Abstract:

PROBLEM TO BE SOLVED: To perform the alignment of an LSI and a probe accurately for accurate probing to a miniaturized LSI electrode such as an area bump in the electric inspection of the LSI by an LSI tester.

SOLUTION: An LSI 13, which is picked up from a tray part, is carried to a positioning stage part 2 by a handler part 9 at first. After one-side contact correction is performed with the outer-shape reference of an LSI package, the LSI is carried to the upper part of a CCD camera 4 in an image processing part. The bump-electrode image obtained by the slant illumination of an LED illuminating part 3 is binarized. The average center-of-gravity coordinates of each bump are computed and compared with the probing position coordinates stored beforehand. Thus, the amount of position deviation is computed, and the correcting movement is performed. After the positioning of the LSI 1 and the probe is completed by this procedure, the handler part 9 carries the LSI 13 to a socket part 10, and probing is performed to the LSI electrode.



LEGAL STATUS

[Date of request for examination]

16.10.1996

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number] 3019005

[Date of registration] 07.01.2000

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right] 07.01.2003

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CLAIMS

[Claim(s)]

[Claim 1] In the LSI handler which aligns PUROP to the bump electrode of LSI in order to conduct electric inspection of LSI The tray section which carried LSI, and the positioning stage section which performs positioning on the basis of the appearance of an LSI package, The CCD camera section which incorporates as an image the bump electrode with which LSI was made detailed, The LED lighting section which irradiates said bump electrode at the quantity of light of arbitration, and an include angle, and the image memory board section which memorizes the bump electrode image which incorporated in said CCD camera section, While controlling by the parameter which memorized beforehand ON/OFF and the quantity of light of said LED lighting section and performing image writing / reading control to said image-processing board section A bump electrode coordinate is searched for by binarization processing from the bump electrode image memorized in said image memory board section. The image-processing section which has the central-process section which computes the amount of location gap amendments from the probing position coordinate memorized beforehand, and transmits to a handler control section, Perform LSI which took up from a probe, the socket section which consists of LSI sockets, and said tray section in said positioning stage section, and piece reliance amendment is performed on LSI package appearance criteria. While only the movement magnitude memorized beforehand moves, conveying LSI on said image-processing section and sending out image incorporation and an image-processing execute command to said image-processing section after that The handler control section which moves the movement magnitude memorized beforehand and is contacted to said probe after carrying out amendment migration of the handler according to the amount of amendments computed in said image-processing section, It consists of the handler sections which move in X, Y, and the direction of theta with high degree of accuracy according to the migration command from said handler control section. The LSI handler characterized by carrying out conveyance migration while said handler section amends a location gap of LSI in order of said tray section, said positioning stage section, said image-processing section, and said socket section, and carrying out probing to said bump electrode with said probe.

[Claim 2] the LSI handler according to claim 1 which have the LSI conveyance amendment means a means consisted of automatic search algorithms which search the bump electrode location for [which be arrange characteristic / arbitration / while search the bottom bump of the leftmost from the LSI bump electrode image an image have be convey on said image processing section from said positioning stage section and search the coordinate a coordinate separated by the bump pitch to X and Y shaft orientations by make this into a zero] an image processing .

[Claim 3] Using said LED lighting section, shoot an LSI bump electrode a side, illuminate it, and average barycentric coordinates are computed from the image of the shape of each doughnut acquired by performing the edge extract of two or more bump electrodes. The LSI handler according to claim 1 or 2 which has a location gap amendment means to perform this by two specific places to one LSI, to compute the amount of location gap amendments in X, Y, and the direction of theta, and to perform amendment migration according to this as compared with said probing position coordinate.

[Claim 4] The teaching fixture which made the teaching hole of the same diameter as the same coordinate location is set to a metal plate with an LSI bump electrode in a normal probing location. It conveys on said image-processing section by conveying the movement magnitude beforehand memorized by said handler section in the direction contrary to usual. The outside which makes said LED lighting section vertical illumination is an LSI handler according to claim 1, 2, or 3 which has a teaching means to perform the usual LSI bump electrode image processing and the same image processing, and to memorize the computed coordinate as said probing position coordinate.

[Claim 5] The X-axis of each of said handler section and said socket section and a Y-axis have agreed mutually,

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the LSI handler which can carry out probing of the LSI by which the detailed area bump is used especially for the electrode to conveyance and an LSI electrode correctly about an LSI handler.

[0002]

[Description of the Prior Art] When conducting electric inspection of LSI using an LSI circuit tester, it is necessary to carry out probing to an LSI electrode correctly. For this reason, while the location of a probe needed to be correctly doubled with the LSI electrode, rough alignment of LSI and an LSI socket was performed by the conventional LSI handler using a guide pin and guide pin bushing to this demand and the LSI package appearance was positioned with a device guide, probing was carried out [insertion and] at the LSI socket.

[0003] Drawing 8 is drawing showing the contact device of the conventional LSI handler shown in JP,7-263596,A.

[0004] The guide pin 208 attached in the base plate 209 positioned so that the lead 204 with which the head 206 was adsorbed examined [LSI / 200] may insert this conventional example in the contact section 203 of the LSI socket 201 certainly, The guide pin bushing 207 attached in the plate 210 corresponding to it, It consists of a head 206 which adsorbs the trial LSI 200-ed, and an LSI socket 201 inserted while carrying out alignment of the trial LSI 200-ed to a contact location with the device guide 202 on the basis of the mold section 205.

[0005] The trial LSI 200-ed by which the head 206 was adsorbed is conveyed by the coordinate point of having been beforehand set on the socket 201 with the plate 210 etc. Then, guide pin bushing 207 and a head 206 are dropped by pressurization. Guide pin bushing 207 descends being guided with a guide pin 208, and a head 206 inserts the trial LSI 200-ed in the LSI socket 201.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The block diagram showing one example of the LSI handler of this invention

[Drawing 2] Drawing showing the situation of positioning of LSI in the LSI handler of this invention

[Drawing 3] Drawing showing an example of the bump electrode which carries out an image processing in the bump electrode of LSI

[Drawing 4] Drawing for explaining the automatic search algorithm of the target bump electrode in an image-processing procedure

[Drawing 5] Drawing showing the amount of amendments which the image-processing section computes

[Drawing 6] Drawing showing the procedure of registering the probing location used as the criteria of positioning

[Drawing 7] Drawing showing the procedure of making a camera axis of coordinates and the robot axis of coordinates of the handler section agreeing in simple

[Drawing 8] The side elevation (A), perspective view (B) showing the LSI contact device of the conventional LSI handler

[Description of Notations]

1 Tray Section

2 Positioning Stage Section

3 LED Lighting Section

4 CCD Camera Section

5 Image Memory Board Section

6 Central-Process Section

7 Image-Processing Section

8 Handler Control Section

9 Handler Section

10 Socket Section

11 Probe

12 LSI Socket

13 Trial LSI-ed

14 Bump Electrode

15 Image-Processing Range

16 Search Area

17 18 Average barycentric coordinates

19 Barycentric Coordinates

20 Zero

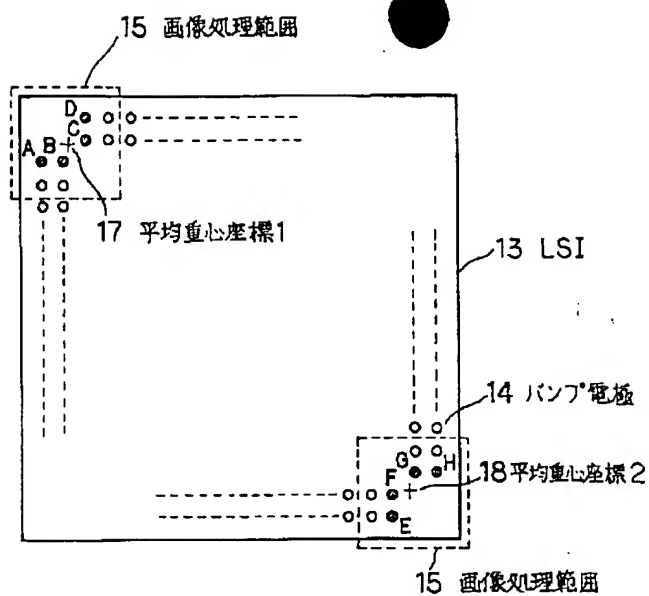
21 22 Probing position coordinate

23 LSI Barycentric Coordinates

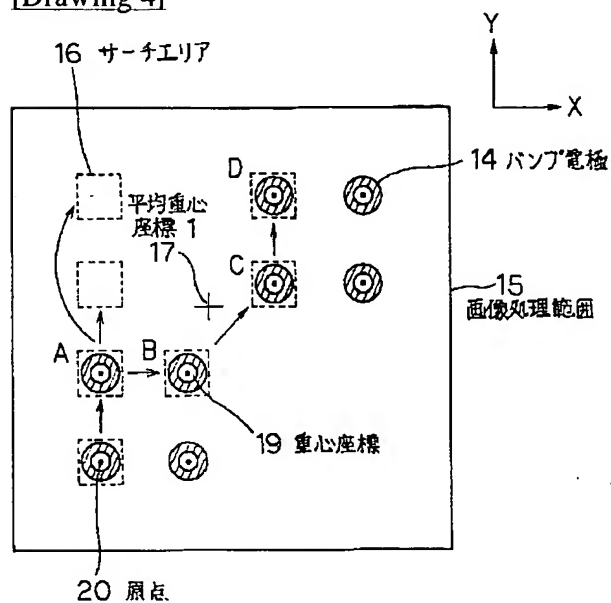
24 Center-of-Rotation Coordinate

25 Teaching Fixture
26 Teaching Hole
27 Gage Pin
28 29 Locating hole
30 Adsorption Slot
31 Camera Axis of Coordinates

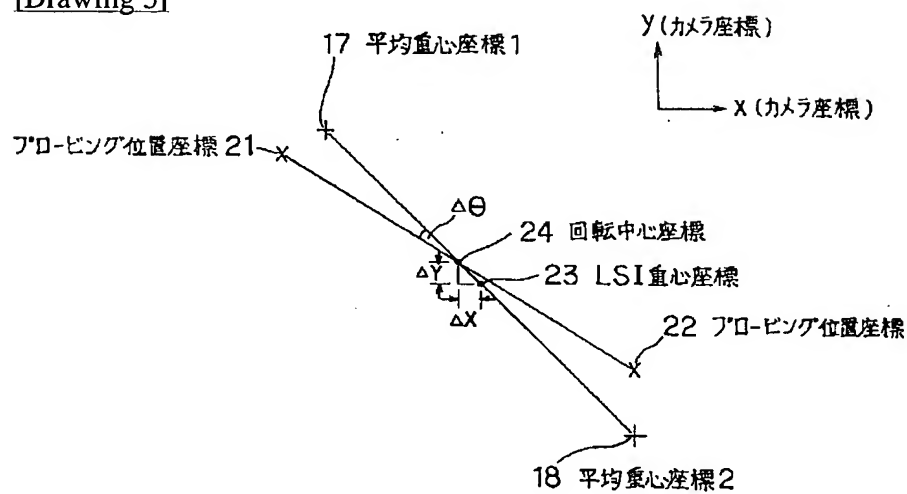
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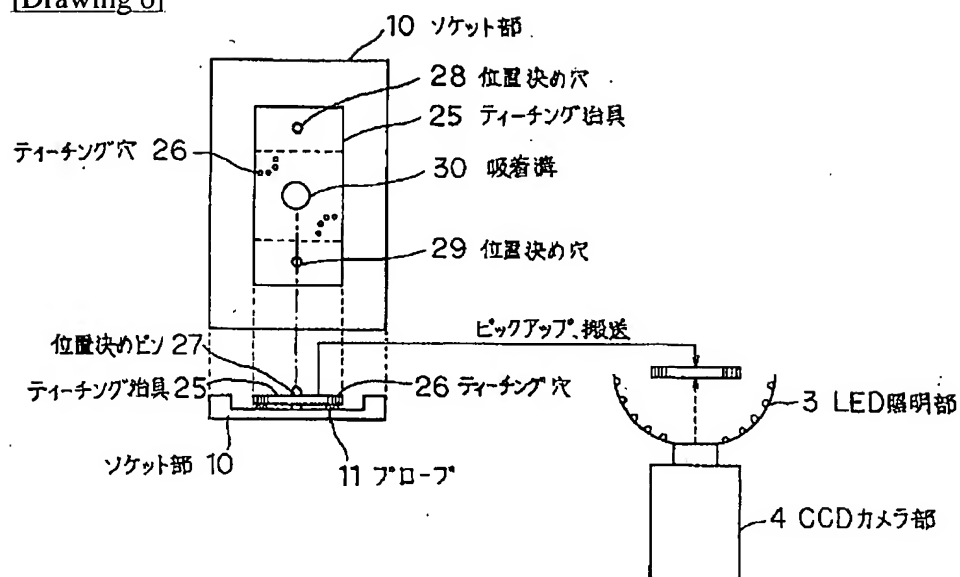
[Drawing 4]



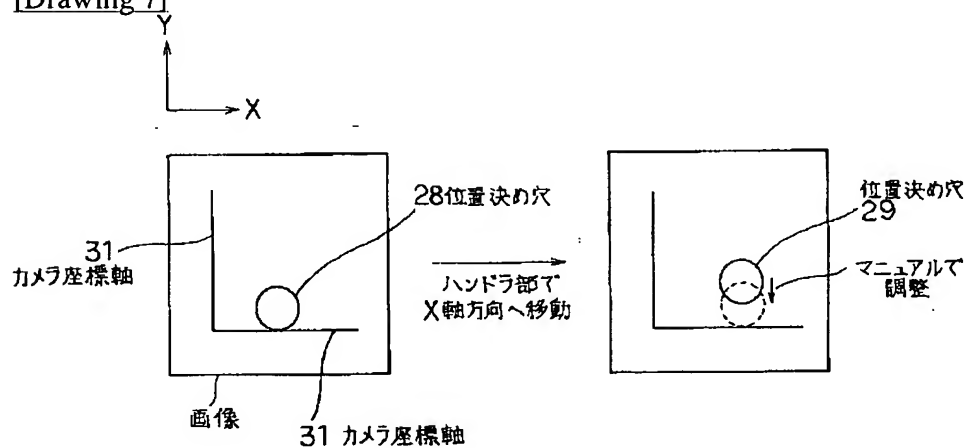
[Drawing 5]



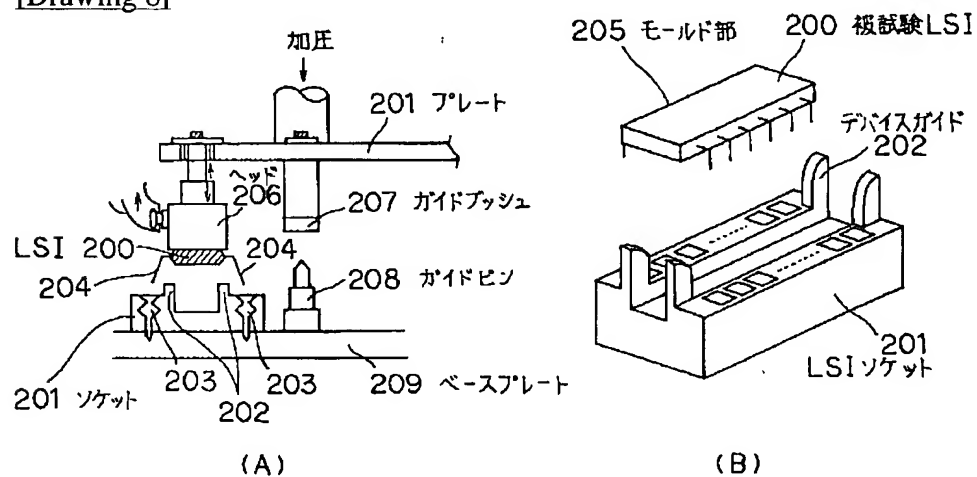
[Drawing 6]



[Drawing 7]



[Drawing 8]



[Translation done.]